

another most important factor—the general clinical condition of the patient. Although in the early stages of the disease prompt remissions are obtained, the life of some of these patients may actually be shortened by overzealous radiation treatment improperly prescribed.

The lymphoblastomas so simulate highly malignant diseases in their clinical course and response to treatment that one familiar with the palliative radiation treatment of cancer may greatly alleviate the suffering of these patients, and actually prolong their lives many years.

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RAYMOND G. TAYLOR, M.D. (1212 Shatto Street, Los Angeles).—Doctor Ullmann's plea for individualization in treatment of these conditions is certainly well taken. However, I feel that one should not get the impression, possible from his paper, that individualization means necessarily small doses. In our own experience, we have had a number of patients who did fairly well, over a long period of time, with fairly large doses—not very often repeated.

Doctor Ullmann reports he had remarkable coöperation in Case 1; and it would seem as though this were an ideal case for the small-dose method that he advocates, and he is to be congratulated on the result. However, the best of coöperation is not often obtained, as he notes in his Case 2.

We have had one patient, as I recall, who absolutely would not return for treatment until she got into a very distressing condition. This was a Hodgkin's, and the lesions were chiefly in the neck and mediastinum. Fairly large doses were necessary to accomplish anything with her at any time. However, we were able to keep her alive and useful (she even went through a pregnancy successfully) for over nine years, but finally died after going East.

I should be interested if Doctor Ullmann would tell us if his patient in Case 1, which had so many treatments and over such a long period of time, has had skin reactions or changes that are still evident.

So far as our experience is concerned, the time comes with all these patients when the lesions become radio-resistant, and then I think larger doses can be used with some benefit. However, the progress of the disease, after evidence of increased radio-resistance in the lesions, is almost invariably down hill and usually rapid.

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JOHN C. RUDDOCK, M.D. (1930 Wilshire Boulevard, Los Angeles).—Doctor Ullmann's paper on the treatment of lymphomatoid disease is a timely one, and it is refreshing to note that he stresses the point that radiologists are considering the patient as an individual rather than a case for such a dose or course of radiation. Lymphomatoid disease is incurable at this time, although it is agreed that it is possible to prolong life by means of radiation. These cases, however, fall within selected groups. We must not lose sight of the fact that although the pathologist has given us a biopsy report of lymphoma, the end-result may be Hodgkin's disease, leukemia, or lymphosarcoma. The prognosis in each of these three types is somewhat different. Leukemia may be either acute or chronic, prognosis in Hodgkin's disease would depend upon the structural involvement, while the prognosis of lymphosarcoma is a very grave problem. Doctor Ullmann reports presence of profound mouth infection in one of the cases. This is merely one instance of things that may happen in cases of this character.

Patients are naturally desirous of living as long as possible, and so demand comfort. In the treatment of cases of this character much can be done toward increasing the longevity and the comfort of life of the unfortunate patient affected by a complete understanding between the radiologist and the patient's physician. Judgment is paramount, and coöperation and coördination of treatment among all those concerned are necessary if the welfare of the patient is to be considered.

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DOCTOR ULLMANN (Closing).—I agree with Doctor Taylor that individualization does not necessarily mean small doses. There are instances where the dose should be increased, but as a rule these are the exceptions. I can only emphasize my statement that clinical judgment in treating these patients is essential.

There are never any skin reactions when the small-dose method is used with heavy filtration. In fact, reactions would preclude such continuous treatment. In the patient with Hodgkin's disease the skin over the mediastinum is now showing some dryness and tan, but this has always disappeared whenever there is a long interval between treatments. Of course, he was warned not to take sun baths and to keep the chest covered when on the beach.

I am in accord with Doctor Ruddock that the best interests of the patient are served when there is complete coöperation between the internist and the radiologist. Unfortunately, in practice this does not always occur, as each physician assumes the other is watching the patient and the internist too frequently exercises his own judgment, regarding further treatments, without consulting the radiologist. This often results in postponement of treatment beyond the point where the greatest benefit would accrue.

## TOXEMIAS OF LATE PREGNANCY\*

By JAMES V. CAMPBELL, M.D.

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DISCUSSION by H. A. Stephenson, M.D., San Francisco; L. Grant Baldwin, M.D., Pasadena; John W. Sherrick, M.D., Oakland.

IN reading the literature on the toxemias of pregnancy, one is always rather alarmed by the high incidence of mortality, both maternal and fetal. Maternal deaths in eclampsics vary in different reports, but in this country they average about 20 per cent and fetal mortality ranges from 3.62 to 42 per cent.<sup>1,2,3</sup> While much has been done to better the general welfare of pregnant women, "no substantial decrease has been made in the death rate due to toxemias and chronic nephritis."<sup>4</sup>

The next factor which stands out is the great variety of etiologic factors that have been suggested and the strictly empiric or symptomatic treatment resorted to.

A third observation which seems significant is the apparently definite relationship of the early toxemias to the late toxemias. This will be discussed later in the paper.

The present report represents 168 women, who developed signs and symptoms of toxemia, in a series of 4,979 consecutive deliveries in the private practice of several physicians—an incidence of 3.35 per cent. Other reports give a higher percentage of toxic patients, but their definition of beginning toxemia varies somewhat from this one especially as to what constitutes elevated blood pressure.

### PATIENTS INCLUDED IN THIS STUDY

Any patient who developed a blood pressure of 150 systolic or over, or showed other definite signs or symptoms of toxemia such as albuminuria, edema, persistent headaches, etc., was included in the study. If she had edema of the lower extremities only, with no other evidences of toxemia, she was not included because it is felt that edema of this nature is due to pressure with a resultant poor return circulation. No cases of acute yellow atrophy were encountered. Five patients who had primary arterial hypertension or "essential hyper-

\* Read before the Obstetrics and Gynecology Section of the California Medical Association at the sixty-fifth annual session, Coronado, May 25 to 28, 1936.

tension" were included. These individuals had their hypertension when first seen, but no other indications of toxemia developed while under observation.

The term "eclampsia," as used in this paper, indicates the presence of true convulsions or coma. Preëclampsia means the nonconvulsive toxic patient.

#### AGE INCIDENCE

The age incidence varied from 18 to 45 years, with an average age of 30.2 years. In most articles on toxemia it is noted that there is a marked preponderance of primiparae, and this report is no exception. Primiparae accounted for 114, or 68 per cent, of the toxic patients. Of the fifty-four multiparae, twenty-seven (50 per cent) had had toxemia during their first gestation, and five of these patients were toxic for a third consecutive pregnancy. Other writers<sup>3</sup> also report that 50 per cent of toxic patients develop toxemia in subsequent pregnancies.

Adequate prenatal care in the majority of cases is indicated by the fact that these patients were under observation on an average of five months, and their average weight gain was only twenty-two pounds, which is within normal limits.

#### TREATMENT PROCEDURE

A fairly uniform type of conservative treatment was tried as soon as the first signs of impending toxemia appeared. Depending upon the severity of the disease, the following routine was followed: (1) rest (restricted activity, bed rest, or hospitalization); (2) diet (salt-free, low protein, forced fluids, fruit juices, milk); (3) elimination (citrate of magnesia, colonic irrigations, or magnesium sulphate either by mouth or intravenously); (4) alkalization; (5) quite frequent use of nephritin; (6) sedatives. Venesection was never done. It is interesting to note the relative frequency of the first warning signals of toxemia: albuminuria, 94; elevated blood pressure, 69; edema, 9; convulsion 1; epigastric pain, 1.

#### SOME SIGNS AND SYMPTOMS

Further observations on the frequency of signs and symptoms that developed during the disease and were sufficiently severe to be noted showed the following ratio: albuminuria (with or without casts), 158; elevated blood pressure (150 or over), 136; edema, 91; headache, 58; nausea (with or without vomiting), 29; eye symptoms, 16; epigastric pain, 11.

This group of patients were observed on an average of 30.5 days from the time of the initial appearance of toxicosis until delivery. While conservative treatment was always tried, when possible, immediate delivery was done whenever the patient did not respond to her treatment. It was felt that conservatism ceased to be advisable if the patient was allowed to develop true eclampsia, or was becoming markedly worse. Dieckman<sup>5</sup> expressed the opinion, generally held in this series of cases, when he stated that if there was no improvement in the toxemia, or that the condition

became worse after seven to ten days of treatment, the pregnancy should be terminated.

#### TYPE OF DELIVERY

The method of delivery was also based upon the theory that to follow conservative methods to their logical end would result in the loss of more mothers and more babies. The following table bears out this contention:

TABLE 1.—*Types of Delivery*

Type of Delivery		Maternal Death	Fetal Death
Normal	57	2	8
Forceps	41		
Low, 16			2
Mid, 20			
High, 5			2
Breech	10		2
Version and extraction	5		2
Cesarean (35.12 per cent)	59	0	
Classical	52		2
Tubal ligation	1		1
Hysterectomy	4		1
Vaginal	3		3
Total deliveries	168	2	23
Twins	6	1.2%	13.2% corrected
Total number of babies	174		6.32%

In 168 deliveries of 174 babies, there were fifty-seven normal deliveries with two maternal deaths (the only maternal mortality in the entire series), and eight fetal deaths. Forceps were applied forty-one times, with four dead babies being born. Two fetal deaths followed the ten breech extractions, one craniotomy, and one of a set of twins. Following five version and extractions, there were two fetal mortalities.

#### MORTALITY

The first maternal death was that of a forty-year-old patient, who had had seven previous normal pregnancies with normal deliveries. Five days before labor she developed a mild preëclamptic toxemia. Two days following normal labor she was found to have a right pyelonephritis superimposed on a chronic nephritis, verified at autopsy. Death occurred eleven days postpartum. The baby was living and normal.

The second patient to die was thirty-six years of age, and in her second pregnancy. She had had a moderate preëclamptic toxemia for the last two weeks of her first pregnancy. She developed her first evidence of toxemia thirty hours before this confinement. Following hospitalization, labor was induced and she was delivered normally of a healthy, full-term child, though she had one convulsion during labor. A moderate postpartum hemorrhage was noted. Her condition became worse and death occurred only a few minutes after delivery.

Of the entire series there was a maternal mortality rate of 1.2 per cent, while the fetal mortality rate was 13.2 per cent with twenty-three deaths. By eliminating the prematures (before seven months), macerated fetuses, and the two babies,

already dead, on whom craniotomy was done, a corrected rate of 6.32 per cent is obtained.

#### CESAREAN SECTION

Cesarean section was done in fifty-nine cases—an incidence of 35.12 per cent—with no maternal and seven fetal deaths, all but one being premature. The classical operation accounted for fifty-two of these; four others were followed by hysterectomy, the so-called Porro section; three were delivered by vaginal hysterotomy.

Induction of labor was attempted with sixty-five patients, using one or more of these methods: castor oil and quinin, bagging, rupture of membranes, and some form of pituitrin. Four of these were not successful and eventually the patients were sectioned.

Because of the large percentage of cesarean sections, as compared with other reports, these are more completely analyzed:

TABLE 2.—Patients Upon Whom Cesarean Sections Were Done			
Cesarean			Fetal Deaths
Indication: Toxemia (33)			
Fulminating		20	
Only reason	12		1
Disproportion	4		
Relative			
Flat pelvis	3		
Soft parts	1		
Progressive toxemia	4	9	1
Failure of induction	4		
Vaginal hysterectomy	2		2
Only cause given		4	
Indication: Obstetrical (26)		11	
Disproportion			
Funnel pelvis	5		
Relative	3		
Flat pelvis	2		
Justo minor	1		
Previous cesarean		4	
To sterilize		4	
Hysterectomy	3		
Tubal ligation	1		1
Abruptio placenta		3	
Classical	1		1
Hysterectomy	1		1
Vaginal	1		
Heart disease		2	
Elderly primipara		2	
Total	59		7
Corrected			11.47%
			1.7%

The patients who had the cesarean operation can be grouped into two classes: (1) the cases in whom toxemia was the primary factor; (2) those who were operated for some other cause, but happened to have a relatively mild toxemia.

Of twenty-three cases of fulminating toxemia, twenty were sectioned. These were subdivided into twelve cases, who were operated because of the toxemia alone—one fetal death (prematurity); four with disproportion; four with long, uneffaced cervixes—one fetal death (prematurity). In the last eight cases it was felt that a prolonged labor would mean almost certain death of the baby, and would greatly add to the danger to the mother.

Four individuals were operated in whom no other cause than toxemia was stated in the records.

Nine patients showed definite signs of a progressing toxemia, which did not yield to conserva-

tive treatment. In four incidences induction of labor failed. Two of the nine had vaginal hysterotomies, with loss of both babies: one premature, and one craniotomy on a dead baby.

Thus, thirty-three cases were operated upon because of a severe toxemia, although about 58 per cent of this group had added indications.

#### OTHER THERAPEUTIC INDICATIONS

The indications for the remaining twenty-six individuals were primarily obstetrical. Disproportion accounted for eleven, with no deaths. Four patients had had previous section. Sterilization was either requested or urged four times: three of these were done by cesarean with hysterectomy, and one had tubal ligation following classical section at eight months, when the baby died two days postpartum. It is interesting to note that the indication for sterilization was the same in each case—toxemia in all preceding pregnancies. Hemorrhage, due to premature separation of the placenta, occurred three times: one classical section; one vaginal cesarean (loss of baby—prematurity); and one classical section followed by amputation of the fundus. In the last case the patient was forty-one, had had one previous baby, but lost this one due to prematurity. Two patients had heart disease sufficiently severe to be advised against vaginal delivery, and two were elderly primiparae.

No maternal deaths occurred among the fifty-nine patients who were delivered by cesarean section. Of sixty-one babies born, there were seven fetal deaths (11.47 per cent) with a corrected mortality rate of 1.7 per cent.

#### ECLAMPTIC GROUP

Of course, it is in the eclamptic group that the greatest danger lies. There were twenty patients who developed convulsions of varying severity—an incidence of 12 per cent of the 168 toxemias reported. Two of these were comatose when first seen. Classical cesarean section was resorted to in thirteen incidences; normal delivery in three; forceps in three; and vaginal section in one. One maternal death following normal delivery resulted in this group, a mortality rate of 5 per cent. The number of fetal deaths were four (20 per cent) with a corrected fatal mortality rate of 5 per cent.

TABLE 3.—Summary on Eclamptic Patients

	Babies Living	Born Dead
Total number of toxic patients.....168		
Pre-eclamptics.....148		
Eclamptics (12 per cent).....20		
Convulsions:		
Antepartum.....	6	3
Postpartum.....	5	0
Both.....	5	1
	16	4
Deliveries:		
Cesarean.....13		
Normal.....3		
Forceps.....3		
Low.....1		
Mid.....2		
Vaginal cesarean.....1		
Maternal deaths.....1—5%		
Fetal deaths.....4—20%		
Fetal deaths corrected.....5%		

## EVALUATION OF TREATMENT PROCEDURES

To try to evaluate any given form of treatment or any particular policy that may be followed in the care of the toxemias of pregnancy, is very difficult. We are dealing with a disease entity, the cause of which is obscure and the treatment symptomatic. A policy, such as was followed in this series of cases, would probably give rather disastrous results to the untrained person. Considerable judgment is necessary if one expects to have a relatively high incidence of operative deliveries with this type of patient and still keep the deaths at a minimum.

Conservative treatment and delivery certainly should be the care of choice for the general practitioner. For the specialist, who is adequately trained, a more radical point of view may be taken, to the advantage of both mother and child.

We know that about 50 per cent of women who have a toxicosis in one pregnancy will develop the same condition in subsequent pregnancies, with a resultant permanent damage to the cardio-vascular systems.<sup>8,9</sup> The longer a woman is subjected to the effects of the toxins the more extensive will be the permanent damage and, consequently, the shorter her life expectancy. Herrick and Tillman<sup>6</sup> conclusively show this to be true. Hence, the necessity for immediate termination of the fulminating cases and those patients who become worse under conservative treatment.

## COMMENT

The following discussion is not based on an extensive scientific study, but represents an opinion founded on clinical observations and deductions made from our present knowledge of the toxemias. No attempt will be made to elaborate upon the many theories suggested to date.

It is generally conceded now that there is a definite association between the nausea and vomiting of early pregnancy and the toxemias of late pregnancy. A number of authorities agree that this disease entity is due to some toxin or toxins of unknown origin,<sup>8,9,2</sup> which have a predilection for different organs in different individuals leading to classifications of toxemias on a basis of symptoms and pathology.<sup>9</sup> McIlroy<sup>4</sup> states that "different symptoms may preponderate at various stages of pregnancy, but the ultimate cause is the same in most cases." This association is shown in the series just reviewed. About 50 per cent of all pregnant women have varying degrees of nausea in the first trimester,<sup>8</sup> but we find that 71 per cent of the above group record this complaint. Further analysis of the data shows that nausea occurred early in pregnancy in 76 per cent of the severe toxemias, and this ratio is raised to 81 per cent of the patients who later developed convulsions. Seemingly, the more severe the subsequent toxemia the more frequent will have been early nausea.

We are taught that adequate prenatal care will cut down the frequency and severity of toxemia. No doubt this is true, but how can one account for an incidence of eclampsia of one to two hundred and fifty deliveries in this group, which cer-

tainly have had better prenatal care than in the country as a whole where the incidence is one to six hundred deliveries?

## RÔLE OF TOXINS AND ALLERGENS

It is felt by the essayist that the etiology of the toxicoses of pregnancy in many cases may be based upon the increased sensitization of the patient to the presence or formation of toxins or allergens foreign to the host. These in some way may react to or with a certain hormone or hormones (possibly gonadotropic) to form the symptom-complex known as the toxemias of pregnancy.

As examples, the following may be cited. Any infectious process, such as teeth, tonsils, appendix, endometritis, etc., can form a toxin which is developed within the patient. Furthermore, we know that if this focus of infection can be removed, a certain number of toxic pregnant women will become symptom-free of their toxemia.

Allergens also may be the exciting cause. A thirty-year-old primipara, who complained of frequent headaches and skin eruptions before pregnancy, developed a severe nausea and vomiting with upper abdominal pain. Hospitalization on two occasions only gave temporary relief. An acute pyelitis appeared, was helped by kidney lavage, but underwent spontaneous cure when sufficient acidosis occurred. After removal of milk and eggs from her diet, her nausea and vomiting immediately cleared up, with no recurrence unless she "cheated" on her diet.

The relationship of the toxic element with the hormonal is based upon three proved observations. First, is the pregnancy test of Aschheim and Zondek, in which large amounts of anterior pituitary substance are produced shortly after conception. In the hydatidiform mole, a greater quantity of the hormonal substance is given off. Can there be any association between this and the fact that toxemia is more frequent in the presence of a mole? Secondly, Knepper<sup>11</sup> and Rössle<sup>12</sup> have reported typical eclamptogenic lesions of liver and kidney in experimental animals by the injection of posterior pituitary extract and horse serum. Lastly, Evans<sup>7</sup> has shown that "gonadotropic hormone is abundant in the urine by the first missed period and reaches a maximum by the fourth to fifth month of pregnancy. In the toxemias of pregnancy, extremely high amounts have been encountered in the last third of gestation. The hormone disappears very rapidly following termination of pregnancy." When one interrupts pregnancy, one accomplishes two things: almost immediate cessation of toxemia and marked reduction in the concentration of pregnancy hormones.

## OTHER THEORIES CONCERNING THE TOXICOSIS

It does not seem tenable that the products of conception, as such, could in any way form a toxic substance which would be detrimental to the host. This theory has been suggested several times and more recently by some German writers. Egorov<sup>13</sup> maintains that the ovum is normal, and there is no specific toxin in the toxicoses of pregnancy, but that it is an allergic reaction because the

normal immunity of the mother toward the growing ovum is underdeveloped or absent. This especially is true in patients prone to metabolic disturbances. May not the "neurotic" patient, who more frequently develops toxemias, also be prone to more severe metabolic disturbances?

On the other hand, Jegerov<sup>14</sup> states that the toxicosis is due to a sensitization to the waste products of fetal metabolism. If there is a reaction to the products of conception or their waste products, why is the human being the only animal that manifests any evidence of toxemias? Why did Bergsma,<sup>8</sup> during nine years of practice in Java, never see a case of eclampsia? Why was there 50 per cent less eclampsia in Germany during the war than in peace times?

It may be possible that primiparae are more liable to toxemia than multiparae because they are experiencing their first major hormonal-allergic test. If so, may they not develop a desensitization to these allergens which is more or less permanent and so prevent toxemia from appearing later in the pregnancy or during subsequent pregnancies? The multiparous patient, with an allergic diathesis, would then be the one who has repeated toxicoses.

Irving<sup>15</sup> has recently published an article giving the pathology to be found in the preëclamptic and the eclamptic patient. The conclusion reached was that the essential lesion is an arteriolar spasm affecting especially the peripheral arteries of the brain, kidneys, and liver, although all arterioles were similarly constricted. He suggests that this spasm may be due either to stimulation of the vasomotor center or direct action on the vessels. The train of signs and symptoms found in the toxemic patient can be accounted for on this basis. Other authorities<sup>10-15</sup> have suggested that the liver and kidney lesions were of vascular origin due to the effects of toxins.

Bartholomew and Krake<sup>17</sup> reported that "hypercholesteremia due to hyperpituitary or hypothyroid activity was the fundamental basis for the toxemias of pregnancy," and that this is "further increased by a diet high in cholesterol-containing foods." What of the hypothyroid Eskimo, who lives on fish, meat, and blubber?

#### COMMENT

Treatment offers another source of conjecture because of diametrically opposed ideas. One reads of good results obtained from forcing fluids and limiting them, of satisfactory reports when proteins are given or restricted. The controversy of conservative and radical treatment continues to rage. In the end one is left to abide by his own judgment and experience.

Unlike syphilis or tuberculosis, which can give a multiplicity of pathologic and clinical changes due to one agent, we will probably find that in the toxemias of pregnancy we are not dealing with one specific factor, but an increased activation of toxins and allergens in association with hormonal influences.

Perhaps it is a pessimistic point of view, but as long as civilization makes its demands upon us to live a strained abnormal life and requires that we indulge in perverted diets, etc., pregnant women are going to continue to have toxicoses and eclampsia. At best, we can only reduce the incidence of each and prevent some deaths by prophylactic measures and quick action if our treatment proves ineffectual.

#### IN CONCLUSION

1. In 4,979 consecutive deliveries, 168 women (3.35 per cent) developed toxemia of late pregnancy. Twenty (12 per cent) of the toxic patients developed eclampsia.

2. There were two maternal deaths (1.2 per cent) and twenty-three fetal deaths (13.2 per cent, corrected mortality rate of 6.32 per cent).

3. Cesarean section was resorted to in fifty-nine cases, with no maternal deaths and seven fetal deaths (11.47 per cent, corrected mortality rate of 1.7 per cent).

4. Maternal and fetal mortality can be cut to a minimum if the pregnancy is terminated as soon as it is found the patient is becoming worse or not improving under conservative treatment.

5. In the case of fulminating and eclamptic toxemia, cesarean section is the delivery of choice, provided that rapid vaginal delivery cannot be done.

6. To prolong conservative treatment without definite improvement means increased damage to the cardio-vasculo-renal systems, with a resultant shorter life expectancy.

7. There is apparently a definite relationship between the early and late toxemias of pregnancy.

8. This relationship may be based upon an increased sensitization of the pregnant patient to toxins or allergens which in some way react to the greater concentration of pregnancy hormones.\*

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#### REFERENCES

1. Report of American Commission on Maternal Welfare, J. A. M. A., 104:1703 (May 11), 1935.
2. Falls, F. H.: Five Hundred Cases of Eclampsigenic Toxemia, Am. J. Obst. and Gynec., 29:316 (March), 1935.
3. De Lee, J. B.: Principles and Practice of Obstetrics, Fourth Edition.
4. McIlroy, D. L.: Toxemias of Pregnancy, Lancet, 2:291 (Aug. 11), 1934.
5. Dieckman, W. J.: Toxemias of Pregnancy, Surg., Gynec., and Obst., 59:678 (Oct.), 1934.
6. Herrick and Tillman: Toxemias of Pregnancy, Arch. Int. Med., 55:643 (April), 1935.
7. Evans, H. M.: Dysfunction of Pituitary, J. A. M. A., 104:464 (Feb. 9), 1935.
8. Thomas, W. A., et al.: Toxemias of Late Pregnancy, Am. J. Obst. and Gynec., 30:665 (Nov.), 1935.
9. Curtis, A. H.: Text—Obstetrics and Gynecology.
10. Hurwitz, D.: Toxemias of Pregnancy, New England J. Med., 209:1281 (Dec. 21), 1935.
11. Knepper, R.: Allergie und Eklampsie, Klin. Wchschr., 13:2:1751, 1934.

\* The author wishes to express sincere thanks to Drs. F. M. Loomis and J. W. Sherrick of Oakland for extending to him the privilege of using their private records for the statistical data contained in this report.

12. Rössle, R.: *Klin. Wchschr.*, 12:574, 1933.
13. Egorov: Is Eclampsia an Allergic Disease? *Zentralbl. f. Gynak.*, 58:2851 (Dec. 1), 1934.
14. Jegerov, B.: Allergic Theory of Toxicoses of Pregnancy, *Zentralbl. f. Gynak.*, Leipzig, 59:433-480 (Feb. 23), 1935.
15. Irving, F. C.: Vascular Aspect of Eclampsia, *Am. J. Obst. and Gynec.*, 31:466 (March), 1936.
16. Kammer, H.: Allergische Diathese und Allergische Erkrankungen, pp. 291-296, 1934.
17. Bartholomew and Krake: Hypercholesteremia of Pregnancy, *Am. J. Obst. and Gynec.*, 31:549 (April), 1936.

## DISCUSSION

H. A. STEPHENSON, M. D. (490 Post Street, San Francisco).—This analysis of late pregnancy toxemias is a most interesting one. It shows the incidence, diagnosis, and treatment of toxemias as interpreted by a well-trained obstetrician having a large practice and employing the facilities of modern hospitals in the care of his patients.

Much stress has been laid on the importance and value of prenatal care. It should result in discovering the presence of toxemia in its incipency. The institution of prompt treatment at this stage will frequently avoid the more serious complications which come from the condition if allowed to continue too long. In this particular series the prenatal care averaged about five months per patient, which is considered adequate. The author brings out an interesting and rather surprising fact when he shows that about one-half of the multiparae had suffered from toxemia in previous pregnancies. This high figure makes necessary more careful observation and supervision of such patients. Personally, I have found that increased blood pressure is the earliest and most constant finding in toxemia. Doctor Campbell finds that albuminuria comes first.

There can be little criticism as to his procedure regarding treatment. Conservative or medical treatment which he outlines in some detail should be tried first. Should such treatment not result in satisfactory improvement, some procedure to bring about delivery is then indicated. The fact that there were twenty cases with convulsions leads me to believe that medical treatment may have been too long employed, and more prompt delivery might have forestalled some of these convulsions. In my own experience convulsions do not occur nearly as often as here reported (12 per cent). Cesarean section was employed in 35 per cent of these cases as the method of choice in terminating the pregnancy. Even in the patients with convulsions it was used in thirteen of the twenty cases. This would be severely criticized by many authors, and there are many articles in the literature which show that the mortality rate in patients suffering from toxemia with convulsions is greatly increased when cesarean section is done. The results obtained in this series, however, speak eloquently, as there were no deaths in the fifty-nine cesarean cases. The fetal mortality rate is in keeping with that which has been reported from other clinics.

The author is to be congratulated upon the excellent results obtained in this series. After all, this is the test by which work is judged.

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L. GRANT BALDWIN, M. D. (65 North Madison Avenue, Pasadena).—This paper is of interest to all practicing obstetricians, as it discusses a subject we all fear and respect. It differs from most similar reports inasmuch as it deals with a large group of private patients cared for under more or less ideal conditions rather than, as usually is the case, with a group of cases from some large hospital service. It quotes figures we can compare with our own experiences, and does not leave the usual implication that we are reading something somewhat foreign and of chief interest to the larger or teaching institutions. One's first reaction, on reading that 3.35 per cent of a series of 4,979 pregnancies developed sign and symptoms of toxemia, is one of astonishment that adequate prenatal care had not produced a lower incidence; however, more mature thought impresses one with the fact that, inasmuch as toxemias are still of such an unknown and disputed eti-

ology, this incidence is in reality quite low. However, it again proves our inadequacy to prevent these much-feared conditions, failure to prevent them even in the hands of most competent individuals. All of which leads to the conclusion that our methods of prevention are not improving materially, but that our hopes, for the present at least, must be placed in an early apprehension of toxicity, together with prompt and adequate treatment.

Both the believers in the strict conservative method of treatment, and also those who have advocated radicalism, have given ground until today; the majority favor a program essentially similar to that outlined by Doctor Campbell. His statement regarding the opposed theories of treatment, such as increased versus decreased fluid intake, exemplifies the fact that a strictly routine treatment is not advisable, and that each case must be treated on its merits. This rather supports his interesting discussion regarding the possible etiologic values of toxins, allergens, or hormones. This conception is new to most of us, and one difficult of proof; however, certainly not improbable. The massive amount of study now in progress, we hope, will lead to a more advanced understanding of the specific etiology of these conditions; then, and only then, can one hope to decrease the frequency of toxemias. Until then adequate prenatal care, plus prompt and systematic treatment of threatened toxemias with operative interference when conservatism fails, seem our only possible course.

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JOHN W. SHERRICK, M. D. (350 Twenty-Ninth Street, Oakland).—It is difficult to add much of importance to this paper, as Doctor Campbell has covered the subject well and carefully. This report reflects my own and Doctor Loomis' reaction to the whole subject of toxemia of pregnancy. We feel justly proud of these results, namely, a 1.2 per cent maternal mortality and a 6.3 per cent (corrected) fetal mortality, especially when one compares them with the high mortality rate (20 per cent maternal and 36 to 42 per cent fetal), as reported in the literature.

There are several points of special interest in this paper, such as, first, the high incidence of association between early toxemia of pregnancy with late toxemias; second, the tendency for recurrence of toxemia in subsequent pregnancies (50 per cent), thus indicating or favoring permanent kidney and liver damage; third, the persistent failure to arrive at an etiologic explanation of this picture.

Attempts at explanation of an etiologic factor still do not seem to have proof for the various theories. Doctor Campbell's suggestion of a sensitization reaction is ingenious and perhaps much more plausible than most of the others; but it is not proved, and I am afraid we must search further and delve more deeply for the answer. Certainly, it would seem to be a most complex phenomenon whatever is the explanation.

We have always felt that if toxemia patients do not definitely improve under intensive intelligent conservative treatment, their condition is progressing with increasing danger to the mother and her baby and all that this imposes in immediate and remote effects. In such circumstances we have favored relieving the burden by emptying the uterus by whatever method seems safest for both members. Our incidence of 35 per cent of cesarean section may seem high, but the excellent results of no maternal mortality and of only one fetal death—a percentage of 1.7 per cent after elimination of those babies who were too premature to have a chance of survival—more than justify the procedure. We have always felt that this method, instituted relatively early, inflicts the minimum of trauma and stress upon the mother and her babe, and offers the quickest and safest means of relieving the toxic burden imposed upon both, thus preventing avoidable, inexcusable, and dangerous trauma to the baby and to the mother's cardiorenal-vascular system. I think the results reported here will stand comparison with any series treated by the so-called conservative measures. The secret of such success depends on having had these patients under constant prenatal supervision and control; in having available every facility for carrying out adequate care, and in knowing when to interfere. Under such circumstances and with trained obstetricians, so-called radicalism becomes intelligent conservatism.